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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,480	12/15/2003	Zhigang Qi	10964-065001	3469
26161	7590	04/12/2006	EXAMINER	
FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			CHUO, TONY SHENG HSIANG	
			ART UNIT	PAPER NUMBER
			1746	

DATE MAILED: 04/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/736,480

Applicant(s)

QI ET AL.

Examiner

Tony Chuo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 24-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 33 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-23 and 33, drawn to a fuel cell, classified in class 429, subclass 36.
 - II. Claims 24-32, drawn to method of making a fuel cell diffusion layer, classified in class 429, subclass 13.

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the process as claimed can be used to make another and materially different product. The process as claimed can be used to make RSO_2X where X is a halogen which is a materially different product.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

This application contains claims directed to the following patentably distinct species: a) SO_3H , b) PO_3H_2 , c) AsO_3H_2 , d) COOH . The species are independent or distinct because these compounds are chemically distinct.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 1 is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

During a telephone conversation on 4/7/06, a provisional election was made without traverse to prosecute the invention of Group I, Species SO_3H , claims 1-23 and 33. Affirmation of this election must be made by applicant in replying to this Office action. Claims 24-32 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract

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on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 5-6, 11-12, 18-23 and 33 are rejected under 35 U.S.C. 102(a) (e) as being anticipated by Barton et al (US 2003/0157397). Regarding claims 1-3, 18, and 33, the Barton reference teaches a fuel cell comprising a first fuel cell flow plate "16"; a second fuel cell flow plate "16"; an electrolyte membrane "6" between the first and second fuel cell flow plates; a diffusion layer "1", "5", between the first fuel cell flow plate and the electrolyte; and a SO₃H Nafion which is a sulfonic acid moiety bonded to the diffusion layer where the sulfonic acid moiety has the formula RSO₃H and R is a perfluorinated alkyl group where the sulfur is directly bonded to the diffusion layer (See paragraphs [0064],[0065],[0087],[0100] and Figure 2). Regarding claims 5 and 6, it teaches a diffusion layer that is in the form of a carbon paper sheet (See paragraph

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[0057]). Regarding claims 11 and 12, it teaches an electrolyte membrane that is a proton conducting material comprising a perfluorinated sulfonic acid (See paragraph [0086]). Regarding claims 19-23, it teaches a fuel cell system where the fuel cell utilizes fuels in liquid or gaseous phase such as hydrogen or organic fuels (See paragraph [0054]). Therefore, the fuel cell is either a proton exchange membrane, direct feed liquid, direct alcohol, direct methanol, or a direct propanol fuel cell.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al (US 2003/0157397). The Barton reference is applied to claims 1-3, 5-6, 11-12, 18-23 and 33 for reasons stated above. However, the reference does not expressly teach an article where R is an aryl substituted with halogen or an alkyl moiety. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Barton diffusion layer to include an aryl substituted with halogen because the substitution of an aryl for alkyl was held to be obvious (Ex parte Koster 136 USPQ 75 (PO BdPatApp 1963)).

7. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al (US 2003/0157397) in view of Yasumoto et al (US 2003/0198860). The

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Barton reference is applied to claims 1-3, 5-6, 11-12, 18-23 and 33 for reasons stated above. However, the reference does not expressly teach a diffusion layer that comprises a platinum catalyst where the diffusion layer comprises 1 to 50 wt% of the catalyst. The Yasumoto reference does teach a diffusion layer that comprises a platinum catalyst where the diffusion layer comprises 1 to 50 wt% of the catalyst (See Example 1 on page 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Barton fuel cell to include a diffusion layer that comprises 1 to 50 wt% of the catalyst so that the process of making the diffusion electrode can be simplified.

8. Claims 10 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al (US 2003/0157397). The Barton reference is applied to claims 1-3, 5-6, 11-12, 18-23 and 33 for reasons stated above. However, the reference does not expressly teach an aqueous permeability of the article that is greater than the aqueous permeability of the diffusion layer, an article that has an initial contact angle with water that is at least 40% less than the initial contact angle with water with the diffusion layer, or an article that has an initial contact angle with water that is less than 125° and at least 20° less than the initial contact angle of water with the diffusion layer. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Barton diffusion layer to include an article that has an initial contact angle of water that is at least 40% less than the initial contact of water with the diffusion layer, less than 125°, and at least 20° less than the initial contact angle of water with the diffusion layer because the parameter optimized was recognized in the art to be a result effective variable since initial contact angle is a result of the hydrophilicity of the

diffusion layer (In re Boesch, 617 F2d 272, 205 USPQ 215 (CCPA 1980)). In addition, it is well known in the art that the Nafion solution used to treat the carbon paper increases the hydrophilicity of the diffusion layer such that the aqueous permeability of the article is greater than the aqueous permeability of the untreated diffusion layer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

R 4/11/06


MICHAEL BARR
SUPERVISORY PATENT EXAMINER